

3rd AOAC Europe-Eurachem Symposium
March 3-4 2005 Brussels Belgium

Topic: use of different types of methods of analysis

GCXGC-TOFMS, PTVLV-GC-MS/MS and DR-CALUX as screening and alternatives techniques to GC/HRMS for quantitative measurement of dioxins in food and feed.

Gauthier EPPE¹, Jean-François Focant¹, Marie-Louise SCIPPO², Anne-Cécile MASSART¹, Catherine Pirard¹, Guy MAGHUIN-ROGISTER² and Edwin DE PAUW¹

¹ CART, Laboratory of Mass Spectrometry, Faculty of Sciences, University of Liège, Allée de la chimie, Bât B6c, Sart-Tilman, B-4000 Liege Belgium

²CART, Laboratory of foodstuff analysis, faculty of Veterinary Medicine, University of Liège, Boulevard de Colonster, Bât B43bis, B-4000 Liege Belgium

Extensive European Community legislation for dioxins has been adopted after the contamination episodes and the following increased awareness of food issues. In particular the fat contamination crisis of the Belgian food supply highlighted the absence of community legislation in this field. It resulted in enforce regulatory limits in food and feed (Regulation 2375/2001 and Directive 2001/102). The main consequences led to the set-up of large monitoring programs of the food chain. To cope with the great number of samples statistically required for monitoring, the strategy involves the use of cost-effective screening methods (physico-chemical methods or AhR based bioassays for TEQ determinations) and the gold standard gas chromatography-high resolution mass spectrometry (i.e. GC/HRMS) reference method, used to bear out dioxins presence. In addition, the screening methods should be characterized by false negatives rates of less than 1% and the positive or non-complaint samples need afterwards to be confirmed by the reference GC/HRMS method. A panel of the most promising screening techniques for quantitative dioxin and dioxin-like PCBs analysis in food and feed is presented here. Comprehensive two-dimensionnal gas chromatography (GCXGC) coupled to time of flight mass spectrometry (TOFMS), large volume-gas chromatography in combination with quadrupole ion storage mass spectrometry in tandem mode (QISTMS/MS) and dioxin response chemically activated luciferase gene expression (DR-CALUX) screening methods have been developed for dioxin application in food and feed. We compared to GC/HRMS the analytical performances of the candidates in terms of accuracy (precision and trueness), detection and quantification limits, selectivity on real samples at levels close to maximum limits in milk, fish tissue, pork tissue, compound feed and fish oil.